Smart Tech in Region 6 Strategic Plan

Over the last several years, the need has grown for communities and local governments to utilize data and technology to enhance services for residents and businesses. By leveraging data and these smart technologies, communities optimize resource use, reduce costs, and minimize environmental impact. This approach enhances public services such as transportation and healthcare through real-time data and analytics, ensuring quicker responses and better resource allocation. Moreover, smart communities attract investment, create jobs, and foster a high quality of life by offering innovative solutions and improving infrastructure.

The Virginia Smart Community Testbed (Testbed) is a statewide initiative to help communities leverage technology and data-driven solutions to improve residents' lives, promote entrepreneurship, and support business development within the Commonwealth. The primary objectives of the Testbed are to 1) Collaborate with entrepreneurs, startups, and established companies to pilot their smart technology solutions and connect with public sector customers and 2) Connect local, state, and federal government partners with private sector solutions to address their challenges.

The Stafford County Economic Development Authority, in partnership with the Town of Colonial Beach and Middlesex County Economic Development, secured a $96,250 planning grant from GO Virginia aimed at building upon the successes of previous pilot projects of the Testbed by exploring the need for technology-driven solutions and connecting smart technology entrepreneurs and startups with local challenges across GO Virginia Region 6 [PDC 16 (Fredericksburg), PDC 17 (Northern Neck), and PDC 18 (Middle Peninsula)].

In Q3 2023 (July-Sept 2023) and Q4 2023 (Oct-Dec 2023) discovery workshops were organized across Region 6 to gather input from local and regional government and community representatives. The purpose of the meetings was to identify and understand the specific challenges and issues faced by localities within Region 6. This understanding was crucial as it informed the development of a call for solutions to identify technology and data-driven solutions to address these challenges.

In Q1-Q2 2024, a call for solutions was drafted, marketed, and resulted in 28 applications, with 14 selected to present their solutions to local government personnel. This process effectively connected local challenges with viable smart technology solutions, fostering collaborations between the public and private sectors.

Overall, the project effectively engaged local leaders and identified key community issues and corresponding smart technology solutions that would assist the region in utilizing data and technology to enhance services for residents and businesses. This plan summarizes the findings from the discovery and project shaping meetings, identifies potential smart technology solutions, and outlines a roadmap for implementation to drive technology-based economic development and improve the quality of life in the region.

Initial Discovery Workshop Meetings [Q3 2023 (July-Sept) & Q4 2023 (Oct-Dec)]

The project began by identifying local government representatives within GO Virginia Region 6 to invite them to attend discovery and project shaping meetings. Marketing efforts to encourage attendance primarily utilized email communications and direct personal contacts. The purpose of these meetings was to help Region 6 government representatives understand what constitutes a smart community and gather input from local and regional government representatives on specific challenges and issues the region faces with a focus on helping them leverage technology and data-driven solutions in their roles. Key target attendees for these meetings were public sector representatives including:

+ **City/Town Governments** (e.g., administration, city planners, community development, council representatives, economic development, emergency services, environmental management, housing and urban development, human services, IT, parks and recreation, public safety, public works, stormwater management, traffic departments, and water management)
+ **Economic Development Agencies**
+ **Local Transit Agencies**
+ **Local Power and Water Companies**
+ **K-12 Education Providers, Local Colleges, Universities, and Research Institutions**
+ **Community-Based Organizations** (e.g., community development groups, nonprofits, workforce development organizations)
+ **Federal and Military Representatives**

These departments and agencies were identified as those who would most likely be facing challenges that could be solved through smart technology and data-driven solutions.

The meetings took place on November 13th in Colonial Beach, November 14th in Middlesex County, and November 15th virtually. Participants included representatives from local government agencies, such as the George Washington Regional Commission, Town of Colonial Beach, Naval Surface Warfare Center Dahlgren Division, Bay Consortium Workforce Development Board, Middlesex County Economic Development Authority, Gloucester County, and Stafford County Economic Development and included personnel from departments such as utilities, economic development, administration, and transportation.

Attendees described the specific challenges and issues they encountered within their respective jurisdictions in areas such as Emergency Response & Public Safety; Environmental Planning; Waste Management, Water, & Stormwater Control; Traffic Management/Planning & Mobility Planning; and Building Automation, Energy, Grid, Utilities, & Resilience.

These meetings ensured a thorough understanding of the specific needs and issues faced by different communities and informed the problem statements to be included in the call for solutions.

Call For Solutions [Q1 2024 (Jan-Mar) & Q2 2024 (Apr-June)]

The call for solutions was initiated to identify innovative smart technology solutions capable of addressing the economic development challenges identified during the discovery meetings.

Through the discovery and project shaping meetings, several key areas of need were identified. The following problem statements were posted in the call for solutions.

Identified Problem Statements

+ ***Air Quality Monitoring***: Communities and individuals are increasingly at risk due to the adverse health effects associated with exposure to particulates. Regional there are no monitors that read PM2.5 or PM10 and integrate with AirNow.gov. Public sector participants seek solutions that monitor air quality in real-time, support remote monitoring capabilities, and seamlessly integrate with or offer user-friendly mobile applications and community engagement platforms. This comprehensive approach aims to enhance accessibility, user interaction, and community involvement in monitoring and addressing air quality concerns. Solutions should provide accurate data on air pollution levels, enable proactive measures, and engage communities in addressing air quality challenges.
+ ***Digital Divide (Broadband/Connectivity)***: Much of the area has limited broadband and spotty cellular connections, posing challenges for individuals working from home, communities hosting events, and emergency personnel. Public sector participants seek solutions that develop and implement technologies that provide reliable and affordable internet connectivity in areas where traditional broadband infrastructure is lacking; create communication platforms that operate efficiently in low-bandwidth environments; propose solutions that enable remote learning and access to educational resources in areas with limited connectivity; develop telehealth and telemedicine solutions suitable for areas with limited connectivity; encourage the development of platforms that empower local communities to create and share digital content; and proposals addressing the needs of rural or remote farmers by leveraging technology for precision agriculture.
+ ***Healthcare***: Rural communities face challenges in addressing medical emergencies for aging populations due to limited access to ambulances and medical facilities, resulting in delayed response times and inadequate care. Public sector participants seek innovative solutions leveraging technology to improve emergency dispatch services, empower community-based response teams with mobile applications for real-time communication and navigation, and implement data-driven collaboration platforms among local stakeholders. These solutions aim to enhance resource allocation, response times, and overall effectiveness in providing timely medical assistance to elderly residents in underserved rural areas.
+ ***Landfill***: Overfilled landfills are a pressing concern, posing environmental, health, and logistical issues that demand immediate attention. Conventional waste management systems struggle to cope with the increasing volume of urban waste, leading to overfilled landfills, environmental degradation, and compromised living conditions for city residents. Public sector participants seek solutions that focus on developing smart community

solutions that are practical, scalable, and sustainable approaches to waste management that minimize the environmental impact and contribute to building resilient, waste-free communities. Smart solutions integrating sensor networks, data analytics, efficient waste management strategies, and new ways of disposal of trash are encouraged.

+ ***Littering***: Littering continues to be a persistent challenge that impacts the cleanliness, aesthetics, and environmental health of our communities. Despite ongoing efforts to raise awareness, conventional approaches to combat littering have proven to be insufficient. Proposals should focus on developing intelligent, scalable, and user-friendly solutions that not only detect and address littering incidents but also engage communities in fostering a cleaner, more sustainable environment.
+ ***Smart Mobility (Pedestrian, Parking, and Traffic Management)***: The current lack of efficient parking communication tools poses challenges for drivers and communities, leading to congestion and wasted resources. A comprehensive solution is needed, providing real-time parking information accessible to the public. Public sector participants seek tools monitoring vehicular and pedestrian traffic, optimizing flow, and updating parking availability in real-time. Solutions should enhance pedestrian safety, integrate traffic management systems, and enable two-way communication for user input on parking availability and issues. This collaborative approach aims to create a dynamic parking ecosystem, minimizing congestion and enhancing efficiency.
+ ***Water / Wastewater Monitoring & Management***: The current state of water resource management and quality is marked by a significant lack of comprehensive knowledge regarding the origin, utilization patterns, and overall quality of water. Insufficient data and monitoring systems hinder the ability to make informed decisions, leading to challenges in ensuring the sustainable and use of water resources in the face of growing population, climate variability, and increasing demands from diverse sectors. Furthermore, leaks and spills from aging wastewater treatment centers have caused issues for water management and caused local community members to be concerned for personal and environmental safety. Current monitoring systems often lack real-time capabilities, posing potential risks to public health and safety. The absence of immediate alerts and communication tools further exacerbates the problem. Public sector participants seek advanced wastewater monitoring solutions with real-time capabilities and alert sensors. Integration with mobile apps and community engagement platforms is favored. Proposals may involve sensor networks, IoT, and data analytics for comprehensive water management.

The call for solutions was posted on RIoT's website in April 2024 and remained open until mid-May 2024, inviting submissions from entrepreneurs, startups, and established companies interested in collaborating with communities to address their challenges through novel tools and concepts. Key technology areas that were of interest included: AI/ML; Community Engagement Mobile Apps; Data Analytics and Visualization Platforms; Edge Computing; Integrated Sensor Networks; IoT; and Sensors

Applicants were required to detail their technology's specifications, primary and secondary application areas, rationale for community interest, proposed pilot plan, anticipated annual

deployment costs based on outlined problem statements, and expected benefits following a one-year real-world deployment.

Overview of Solution Provider Submissions [Q2 2024 (Apr-June)]

Outreach efforts encompassed targeted email campaigns, social media initiatives, and collaborations with partner organizations to maximize engagement. As a result, the call for solutions garnered significant interest, receiving 28 applications from smart technology providers.

A notable portion of applicants had prior interactions with the Stafford EDA, the Testbed, RIoT, or VIPC through conferences, events, or targeted marketing efforts. These interactions fostered familiarity with our initiatives and motivated companies to apply for grants, underscoring the effectiveness of our outreach strategies in building enduring relationships and attracting enthusiastic participants to our programs.

Geographically, the applicants were widely dispersed, illustrating the grant's extensive reach and impact across diverse regions and communities. 16 applicants were either headquartered in, have administrative and strategic operations performed within Virginia, or have ongoing projects or clients within the state. 9 companies indicated a strong desire to locate within Virginia. This reflects the potential for attracting new businesses and encouraging potential relocations to Virginia, despite their current headquarters being located elsewhere.

In terms of development stages, the applicants identified themselves as follows: 5 corporations, 15 early-stage startups (pre-seed/seed), 3 mid-stage startups (Series A or B), and 5 small to medium enterprises. Regarding company size, applicants reported the following: 20 companies employ 1-19 people, 5 employ 20-99 people, and 3 employ 100-499 people.

Applicants were categorized based on smart city technology areas, with some companies overlapping categories:

+ **Air Quality Monitoring**: 8 companies
+ **Digital Divide (Broadband/Connectivity)**: 7 companies
+ **Healthcare**: 4 companies
+ **Landfill Management / Littering Management**: 2 companies
+ **Smart Mobility (Pedestrian, Parking, and Traffic Management)**: 5 companies
+ **Water / Wastewater Monitoring & Management**: 3 companies

Submissions underwent evaluation based on the criteria specified in the call for solutions. Key considerations included the alignment of the proposed solutions with the specific challenges identified during local government discovery workshops, assessing their potential impact on the community, and evaluating feasibility and scalability. Additionally, submissions were reviewed for their ability to demonstrate tangible impact and cost-effectiveness, their collaborative approach, and their capacity to address multiple challenges or integrate with other solutions as

part of a comprehensive strategy. 14 submissions were chosen to advance to subsequent meetings with local government officials in-person in Stafford, VA and throughout the broader region in June 2024 (see Appendix A).

Smart Tech Discovery Solution Provider Showcase [June 2024]

In June 2024, local government personnel met with identified potential technology solutions and technical solution providers who could address the identified issues. Marketing efforts targeted November meeting attendees and additional local government officials through email campaigns and direct outreach.

The meetings occurred on June 11th in Middlesex County and June 12th in Colonial Beach, drawing 17 local government attendees. Participants included representatives from various organizations such as the Bay Consortium Workforce Development Board, King George Economic Development Authority, Middlesex County Department of Planning, Middlesex Economic Development Authority, Naval Surface Warfare Center Dahlgren Division, Rappahannock Solid Waste Management Board (R-Board), Stafford County Economic Development, and Town of Colonial Beach.

14 solution providers were invited to the meetings with local government officials in-person in Stafford, VA and throughout the broader region in June 2024. The agenda included presentations by each participating company, followed by a dedicated Q&A session aimed at fostering alignment between private-sector solutions and the priorities of public-sector partners. Local government representatives actively engaged in discussions to help companies understand how their solutions could address community needs and support economic development goals. Following these interactions, a matchmaking session facilitated one-on-one meetings between each local government attendee and eight participating companies. Each company had the opportunity to meet with four local government representatives daily, enabling focused discussions on potential partnerships and solution implementations tailored to specific community requirements. Feedback from these sessions highlighted the feasibility, scalability, and expected economic impact of each solution.

Discussions underscored local governments' keen interest in adopting smart technology solutions to address challenges and facilitated the connection between local challenges and viable smart technology solutions, fostering collaborations between the public and private sectors. However, funding emerged as a recurring challenge, with local governments expressing the need for additional financial resources to support these initiatives effectively.

Next Steps & Recommendations

The grant sought to explore opportunities for expanding the existing Testbed into rural localities within Region 6, beyond the Rappahannock region to address community challenges through innovative smart technology solutions. By fostering collaborations between public and private sectors, the grant aimed to foster connections and a desire to implement a technology-based

economic development approach to build smart communities. By engaging local government representatives and understanding key issues localities face, entrepreneurs, startups, and companies from within the region and beyond can help solve these challenges and develop into high growth businesses, attracting talent, businesses, and investment that further propel sustainable development and prosperity.

The final community meetings demonstrated a strong desire among local leaders to implement the identified solutions. However, it was evident that additional funding is necessary to move from planning to execution. To build upon the initial success additional funding should be sought to help ensure sustained progress and long-term impact.

Funding to help coordinate efforts between local government representatives and private sector companies is critical. Regular stakeholder engagement meetings with local government representatives who are interested in deploying smart community solutions is key to help shape successful projects. Consistent communication and collaboration are essential for identifying new challenges, refining smart technology solutions, and aligning resources to address community needs effectively.

In addition to the coordination efforts, the project should allocate seed funding to support the deployment of smart community solutions. This funding will enable entrepreneurs, startups, and companies to pilot their innovative technologies and demonstrate their viability in addressing the specific challenges faced by local communities. By providing this critical early-stage support, the project can catalyze the implementation of smart solutions and showcase their tangible benefits to the region.

To ensure a sustained pipeline of projects and initiatives, a structured process for identifying, evaluating, and prioritizing new opportunities should be identified. This may involve regular calls for proposals, collaborative workshops with stakeholders, and the development of a comprehensive project management system. By maintaining a robust pipeline, the project can continue to drive progress, adapt to evolving community needs, and foster a continuous cycle of innovation and implementation.

Appendix A: Invited Solution Providers

AWARE Monitoring Systems Inc.	
Category	Air Quality Monitoring Smart Mobility (Pedestrian, Parking, and Traffic Management) Water / Wastewater Monitoring & Management
Description	The AWARE Node, a customizable IoT device that can integrate various sensors to monitor air quality, water treatment, and road conditions. The technology helps governments enhance public safety, improve infrastructure management, and address environmental concerns through real-time data collection and analysis.
Website	awaremonitoringsystems.com

Breeze Technologies	
Category	Air Quality Monitoring
Description	Breeze Technologies' Environmental Intelligence Suite enables communities to monitor air quality, noise, and wildfires, translating data into actionable recommendations. The AI-driven platform provides real-time air quality information to citizens and has improved air quality by up to 70% through its advanced sensor technology and data analytics.
Website	https://www.breeze-technologies.de

Cervais, Inc.	
Category	Digital Divide (Broadband/Connectivity) Healthcare
Description	Cervais, Inc. offers SG-X ConnectPro, a portable secured network solution designed to address connectivity challenges in remote areas. This device provides reliable internet access and communication capabilities, catering to the needs of communities, emergency responders, and remote workers. By offering a robust and secure connection in areas with limited infrastructure, SG-X ConnectPro enhances communication and data access for various users operating in isolated or underserved locations.

Website	https://www.breeze-technologies.de

Data Company One, Inc.	
Category	Landfill Management / Littering Management
Description	GreenScanr, developed by Data Company One Inc., is an innovative app that reduces waste, increases recycling, and prevents litter through data analytics and gamification. The app provides data-driven insights through AI-powered item recognition and engages and educates communities by allowing users to track their environmental impact and rewards them for sustainable actions, thereby promoting a cleaner and more sustainable environment.
Website	https://www.datacompanyone.com/

dependbuild	
Category	Smart Mobility (Pedestrian, Parking, and Traffic Management)
Description	The dependbuild platform helps municipalities execute infrastructure projects on budget, on time, and while meeting environmental, social, and governance commitments, ensuring efficient project delivery, reducing delays and cost overruns, and upholding sustainability and governance standards, ultimately enhancing public infrastructure and community trust.
Website	www.dependbuild.com

LED Roadway Lighting / Liveable Cities	
Category	Air Quality Monitoring Smart Mobility (Pedestrian, Parking, and Traffic Management)
Description	Liveable Cities, a division of LED Roadway Lighting, offers innovative solutions that can significantly benefit rural communities. As a manufacturer of wireless streetlight controllers, smart city micro-sensors, smart software, and energy-efficient LED streetlights, products include air quality sensors for monitoring PM2.5, PM10, NO2, and AQI information, as well as AI-enabled camera sensors for wastewater monitoring, littering management, and traffic, parking, and pedestrian management. These

	technologies can enhance connectivity in rural areas through improved lighting and communication networks, monitor environmental conditions, increase public safety through AI-assisted surveillance, optimize resource management with energy-efficient lighting, and foster community engagement by providing smart, data-driven services. By implementing these solutions, communities can improve their infrastructure, reduce costs, and create a more connected and sustainable living environment for their residents.
Website	www.liveablecities.com

Luna Innovations Inc.	
Category	Digital Divide (Broadband Connectivity) Smart Mobility (Pedestrian, Parking, and Traffic Management)
Description	Luna Innovations' fiber optic sensing technology uses laser light and fiber optic cables to provide comprehensive infrastructure monitoring. It enhances traffic management by detecting vehicle and pedestrian traffic, optimizes parking by monitoring availability and usage, and offers real-time data for informed traffic and mobility decisions. This innovative system supports smarter, more efficient urban mobility solutions.
Website	https://lunainc.com/

Luna Labs	
Category	Water/Wastewater Monitoring & Management
Description	Luna Labs has developed the AcuityTM monitoring systems for long-term, autonomous corrosion and environmental monitoring. These systems continuously measure air temperature, relative humidity, surface contaminants, and corrosion of materials in various settings. The Acuity system helps monitor and predict corrosion in critical infrastructure like bridges, coastal installations, and other public assets, enabling local governments to make informed decisions about asset maintenance and replacement schedules, optimizing resource allocation.
Website	https://acuitycorrosion.com/

Phoenix Waste Solutions Inc.	
Category	Landfill Management / Littering Management
Description	Phoenix Waste Solutions has patented a new technology for a micro waste-to-energy furnace that can thermally reduce 1000 pounds of unsorted Municipal Solid Waste – plastic, rubber, food waste – into 2% ash every hour, without using any fuel, while producing a quarter of the greenhouse gas emissions of landfill. This solution provides a cheaper and decentralized alternative to landfills and the ability to co-generate electricity from the waste disposal process and to use the ash by-product to make bricks using 80% less cement enables communities to meet their landfill avoidance, circular economy and carbon reduction goals.
Website	https://phoenix-waste-solutions.com/

Smart Response Technologies, Inc.	
Category	Digital Divide (Broadband/Connectivity) Healthcare
Description	Delphini™ AI uses phone call keyword alerts and IoT acoustic sensors to provide communities with indicators of mental stress on 911, 988 and inmate calls to reduce suicides that are skyrocketing in communities all across the Nation. Suicides are up threefold in past decade in communities and corrections facilities.
Website	https://smartresponsetech.com/

Tappy Guide	
Category	Digital Divide (Broadband/Connectivity) Healthcare
Description	Tappy Guide is a smart city and mobility solution that enhances accessibility for people with disabilities, including those who are blind, low vision, deaf, hard of hearing, wheelchair users, and seniors. The company utilizes municipal data on sidewalks, bus stops, and other key points to create detailed community maps. These maps enable Tappy Guide's call center operators to provide real-time navigation assistance and support for everyday tasks, helping users navigate their environment more independently and improving their overall quality of life.
Website	www.tappyguide.com

ThruGreen, LLC	
Category	Air Quality Monitoring Smart Mobility (Pedestrian, Parking, and Traffic Management)
Description	ThruGreen offers a smart traffic management solution that connects, monitors, and manages traffic lights, allowing municipalities to remotely monitor and adjust traffic signals in real-time. This technology aims to reduce vehicle emissions, ease congestion for both vehicles and pedestrians, and improve overall air quality and traffic management.
Website	thrugreen.com

TRAXyL	
Category	Digital Divide (Broadband/Connectivity) Smart Mobility (Pedestrian, Parking, and Traffic Management)
Description	TRAXyL has developed FiberTRAX, an innovative method for installing fiber optic cables by "painting" them directly onto paved surfaces. Their patented process bonds and seals the cables with durable protective coatings, eliminating the need for digging or trenching. This minimally disruptive installation technique is environmentally friendly, traffic-resistant, and significantly reduces installation time and costs compared to traditional methods. TRAXyL's technology aims to revolutionize network connectivity infrastructure, making it faster and more cost-effective to deploy fiber optics in various settings and help connect the unconnected.
Website	https://traxyl.com/

VisionCraft	
Category	Digital Divide (Broadband/Connectivity) Smart Mobility (Pedestrian, Parking, and Traffic Management)
Description	VisionCraft offers an innovative AI-driven solution for smart mobility and urban management. Their technology uses edge sensors and existing camera infrastructure to analyze the movement of objects and people in real-time. This system enhances pedestrian, parking, and traffic management by providing actionable insights without compromising privacy. VisionCraft's solution enables communities to optimize flow, improve safety, and make data-driven decisions for smarter city planning and operations.
Website	https://www.visioncraft.ai/